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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/537,566
Filing Date: November 09, 2005
Appellant(s): REVILL ET AL.

EXAMINER'S ANSWER

This is in response to the appeal brief filed 14 April 2009 appealing from the Office action mailed 15 September 2008.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

This appeal involves claims 1, 4, 6, 8 - 12, 17, and 18.

Claims 7 and 34 – 36 are allowed.

Claims 2, 3, 5, 13 - 16, 19 - 22, and 24 - 33 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6,270,098	Heyring et al.	8-2001
6,761,371	Heyring et al.	7-2004
7,210,688	Kobayashi	05-2007

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

1. Claims 1, 4, 6, 8 – 12, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heyring et al. U.S. 6,270,098 ("Heyring '098") in view of Heyring et al. U.S. 6,761,371 ("Heyring '371"). Heyring '098 discloses a vehicle suspension system having a damping and stiffness system for a vehicle (column 1, line 11), the vehicle including a vehicle body and a first pair and a second pair of diagonally spaced wheel assemblies (column 1, line 16), the first pair of diagonally spaced wheel assemblies including at least one front left wheel assembly and at least one back right wheel assembly (column 2, line 7), the second pair of diagonally spaced wheel assemblies including at least one front right wheel assembly and at least one back left wheel assembly (column 5, line 16), the damping and stiffness system including:

2. at least one wheel ram located between each wheel assembly and the vehicle body (column 5, line 46), each ram including at least a compression chamber (column 5, line 50);

3. a load distribution unit interconnected between the compression chambers of the front left, front right, back left and back right wheel rams (column 5, line 65), the load distribution unit including first and second piston rod assemblies (34 and 35), first, second, third and fourth system volumes and first and second modal resilience volumes (fig. 4),

4. the first piston rod assembly defining first, second, third and fourth effective areas, the second piston rod assembly defining fifth, sixth, seventh and eighth effective areas, the first and second piston rod assemblies being located within the load distribution unit such that each piston rod assembly can rotate about and slide along a major axis of the piston rod assembly (column 8, line 58),

5. the first effective area defines a movable wall (22) of the first system volume such that as the first piston rod assembly slides along its major axis, the volume of the first system volume varies, the second effective area defines a moveable wall of the second system volume, the third effective area defines a movable wall (22) of the first modal resilience volume, the fourth effective area defines a movable wall of the second modal resilience volume (column 1, line 66), the fifth effective area defines a movable wall of the third system volume such that as the second piston rod assembly slides along its major axis (column 2, line 7), the volume of the third system volume varies, the sixth effective area defines a moveable wall (24) of the fourth system volume, the seventh effective area defines a movable wall (23) of the first modal resilience volume, and the eighth effective area defines a movable wall (24) of the second modal resilience volume;

6. the first system volume increasing in volume proportionately to the decrease in volume of the second system volume with motion of the first piston rod assembly, the third system volume increasing in volume proportionately to the decrease in volume of the fourth system volume with motion of the second piston rod assembly,

7. the volume of the first modal resilience volume decreasing proportionately to the increase in volume of the first and third system volumes with motion of the first and second piston rod

assemblies, the volume of the second modal resilience volume decreasing proportionately to the increase in volume of the second and fourth system volumes;

8. the first and fourth system volumes being connected to the compression chambers of the wheel rams associated with one of the pairs of diagonally spaced wheel assemblies, the second and third system volumes being connected to the compression chambers of the wheel rams associated with the other pair of diagonally spaced wheel assemblies, the damping and stiffness system thereby providing substantially zero warp stiffness.

9. In reference to claims 4 and 12, Heyring '098 further discloses the first system volume is connected to the compression chamber of the at least one wheel ram associated with the at least one front left wheel assembly, the second system volume is connected to the compression chamber of the at least one wheel ram associated with the at least one back left wheel assembly, the third system volume is connected to the compression chamber of the at least one wheel ram associated with the at least one front right wheel assembly and the fourth system volumes is connected to the compression chamber of the at least one wheel ram associated with the at least one back right wheel assembly, the first modal resilience volume thereby being a front bump resilience volume (30 and 31) and the second modal resilience volume thereby being a back bump resilience volume, the front and back bump resilience volumes thereby providing the damping and stiffness system with additional pitch resilience (column 3, line 38), independent of the roll and heave stiffness of the damping and stiffness system; and wherein the compression chamber of each of at least two of said wheel rams may be in fluid communication with a respective accumulator (column 4, line 35).

10. Heyring ‘098 does not directly disclose a front and rear vehicle resilient support means. Heyring ‘371 teaches a vehicle suspension system including front and rear vehicle resilient support means (17) between the vehicle body and the wheel assemblies for resiliently supporting the vehicle above the wheel assemblies, wherein the vehicle is primarily supported by the vehicle resilient support means which is functionally separate from the damping and stiffness system. It would have been obvious for a person having ordinary skill in the art at the time the invention was made to modify Heyring '098 such that it comprised the front and rear vehicle resilient support means in view of the teachings of Heyring '371 so as to provide independent support means capable of supporting the entire weight of the vehicle (column 11, line 7).

11. In reference to claim 6, Heyring discloses a vehicle suspension system having a damping and stiffness system for a vehicle (column 1, line 11), the vehicle including a vehicle body and at least two forward and two rearward wheel assemblies (column 1, line 15), the damping and stiffness system including:

12. at least two front and two rear wheel rams located between the wheel assemblies and the vehicle body (column 2, line 40), each ram including at least a compression chamber (fig. 1);

13. a load distribution unit (column 7, line 50), includes a first pair of axially aligned primary chambers (18 and 21) and a second pair of axially aligned primary chambers, each primary chamber including a piston (22 – 25) separating each primary chamber into two secondary chambers, a first rod connecting the pistons of the two first primary chambers (column 2, line 60);

14. forming a first piston rod assembly and a second rod connecting the pistons of the two second primary chambers forming a second piston rod assembly (column 2, line 40), one of the

secondary chambers in the first pair of primary chambers being a first front system chamber and being connected to the compression chamber of a front wheel ram on a first side of the vehicle (fig. 2), the other secondary chamber in the first pair of primary chambers which varies in volume in the same direction as the first front system chamber with motion of the first piston rod assembly, being a first back pitch chamber (column 1, line 53),

15. one of the secondary chambers in the first pair of primary chambers which varies in volume in the opposite direction as the first front system chamber with motion of the first piston rod assembly being a first back system chamber (32 and 33) and being connected to the compression chamber of a back wheel ram on a first side of the vehicle, the other secondary chamber in the first pair of primary chambers which varies in volume in the same direction as the first back system chamber with motion of the first piston rod assembly, being a first front pitch chamber,

16. one of the secondary chambers in the second pair of primary chambers being a second front system chamber (26) and being connected to the compression chamber of a front wheel ram on a second side of the vehicle, the other secondary chamber in the second pair of primary chambers which varies in volume in the same direction as the second front system chamber with motion of the second piston rod assembly, being a second back pitch chamber (fig. 2), one of the secondary chambers in the second pair of primary chambers which varies in volume in the opposite direction as the second front system chamber with motion of the second piston rod assembly being a second back system chamber and being connected to the compression chamber of a back wheel ram on a second side of the vehicle (column 1, line 40),

17. the other secondary chamber in the second pair of primary chambers which varies in volume in the same direction as the second back system chamber with motion of the second piston rod assembly, being a second front pitch chamber (column 2, line 7); and

18. the first and second front pitch chambers being interconnected forming a front pitch volume and the first and second back pitch chambers being interconnected forming a back pitch volume (fig 2).

19. In reference to claims 8 – 11 and 17, Heyring further discloses the wheel rams of at least the two front or the two rear wheel rams are single-acting rams (column 1, line 16); wherein each single-acting wheel ram includes a piston dividing the ram into a compression and a rebound chamber (fig. 1), damping being provided in the piston of the ram to provide at least a rebound damping force (fig. 1); wherein the wheel rams at one end of the vehicle are double-acting wheel rams further including a rebound chamber (fig. 1), the rebound chamber of each double-acting wheel ram being connected to the compression chamber of the diagonally opposite wheel ram; wherein each wheel ram is a double-acting ram further including a rebound chamber (fig. 1), the rebound chamber of each double-acting wheel ram being connected to the compression chamber of the diagonally opposite wheel ram; and wherein the front pitch volume is connected to a front pitch accumulator through a front pitch damper valve and the back pitch volume may be connected to a back pitch accumulator through a back pitch damper valve (column 2, line 7), the front and back pitch accumulators provide additional pitch resilience in the stiffness and damping system.

20. Heyring ‘098 does not disclose the vehicle suspension system including front and rear vehicle resilient support means. Heyring ‘371 teaches a front and rear resilient support means

between the vehicle body and the wheel assemblies for resiliently supporting the vehicle above the wheel assemblies (column 2, line 57), wherein the vehicle is primarily supported by the vehicle resilient support means which is functionally separate from the damping and stiffness system. It would have been obvious for a person having ordinary skill in the art at the time the invention was made to modify Heyring '098 such that it comprised the front and rear resilient support means in view of the teachings of Heyring '371 so as to provide independent support means capable of supporting the entire weight of the vehicle (column 11, line 7).

21. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heyring '098 and '371 as applied to claims 6 and 17 above, and further in view of Kobayashi, U.S. 7,210,688 ("Kobayashi"). Heyring '098 and '371 do not disclose at least one of the front and rear pitch damper valves is a variable damper valve. Kobayashi teaches a variable damper valve (26). It would have been obvious for a person having ordinary skill in the art at the time the invention was made to modify Heyring '098 and '371 such that it comprised the variable damper valve in view of the teachings of Kobayashi so as to suppress bouncing of the vehicle body and mitigate shock from the road surface (column 6, line 4), and maintain vehicle height in accordance with load (column 8, line 24).

(10) Response to Argument

The appellants' arguments were fully considered but not found persuasive. Appellants propose patent reference 6,010,139 that obviates the use of ordinary springs and conventional telescopic dampers, and patent reference 5,447,332 that eliminates the use of conventional spring components. Because Heyring '098 is derived from the 6,010,139 patent, Appellants conclude that the addition of the resilient means of Heyring '371 would teach against the reference.

Appellants argue that because Heyring '098 supports the vehicle body, the additional resilient means of Heyring ‘371 gives no incentive to add it to Heyring '098 and would only add to the cost and weight of his invention. Appellants argue that the additional resilient means would prevent the hydraulic system from fully contributing support as its design intended, or must be designed differently.

Though the references cited in the arguments may disclose a hydraulic suspension that eliminates the use of conventional spring components, Heyring ‘098 does not explicitly state the use and purpose of lacking springs, nor preclude the inclusion of springs for load distribution of its suspensions or the additional resilience it provides. Mere argument that a combination of components would add to the cost and weight of an invention does not predicate patentability. The separate resilient means could in fact give additional support to the vehicle suspension, and be designed as desired, and in turn have predictable results. Suspension systems with an additional or separate resilient means such as coil spring, leaf spring, or shock absorber, etc. are old and well known in the art at the time the invention was made, and are often used for redundancy as a fail-safe in case a component fails and insures continued operation. The mechanical spring of Heyring ‘371 is placed in parallel to the supporting hydraulic system and would not inhibit the function and design of the Heyring ‘098. The current rejection stands.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner’s answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/K. J. A./

Examiner, Art Unit 3616

/Paul N. Dickson/
Supervisory Patent Examiner, Art Unit 3616

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